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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/821,172

04/09/2004

Jin-ho Kim

1572.1340

8402

21171 7590 12/27/2006
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EXAMINER

KOCA, HUSEYIN

ART UNIT

PAPER NUMBER

3744

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

12/27/2006

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.		Applicant(s)	
	10/821,172		KIM ET AL.	
	Examiner		Art Unit	
	Huseyin Koca		3744	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 and 18-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 15-17 is/are allowed.
- 6) ☒ Claim(s) 1-14 and 18-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04/09/2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>05/16/06</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

[001] The drawings are objected to because:

- Coolant tube accommodating part (31) is not shown in Fig. 5 (0025, line2)

[002] The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description:

- "a" (0028, line-1,5,6,9)

[003] The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description:

- " α " in Figure 6

[004] Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be

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notified and informed of any required corrective action in the next Office action.

The objection to the drawings will not be held in abeyance.

[005] In addition to Replacement Sheets containing the corrected drawing figure(s), applicant is required to submit a marked-up copy of each Replacement Sheet including annotations indicating the changes made to the previous version. The marked-up copy must be clearly labeled as "Annotated Sheets" and must be presented in the amendment or remarks section that explains the change(s) to the drawings. See 37 CFR 1.121(d)(1). Failure to timely submit the proposed drawing and marked-up copy will result in the abandonment of the application.

Claim Rejections - 35 USC § 103

[006] The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

[007] Claims 1-3, 5, 7, 8, 10-14, and 18-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ho (5,499,514) in view of Anders (4,542,786).

[008] In regard to claim 1, Ho teaches a refrigeration apparatus generating cooling air. Ho uses an evaporator (24) comprising a coolant tube (40) having at least one bending part, and at least one heat exchange fin (42) with at least one coolant tube (40) accommodating part contacting the coolant tube (C-3; L-47-51). A defrosting unit (44) adjacent to the evaporator is used for removing frost formed on the evaporator (C-3; L-52-53). Ho does not explicitly teach the details

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of the heat exchange fin. Anders teaches a heat exchange fin (14) being inclined by an inclination angle so that longitudinal direction of the heat exchange fin forms an acute angle relative to vertical direction (C-5; L-49, 52-53). Opposite sides of the heat exchange fin includes rounded corner parts (C-6; L-3). It would have been obvious to one having ordinary skill in the art at the time the invention was made to use Anders's heat exchange fin with rounded opposite corners in Ho's refrigeration apparatus for safety reasons such as to prevent the fins from damage and avoid being injured or getting cut by the fins during installation.

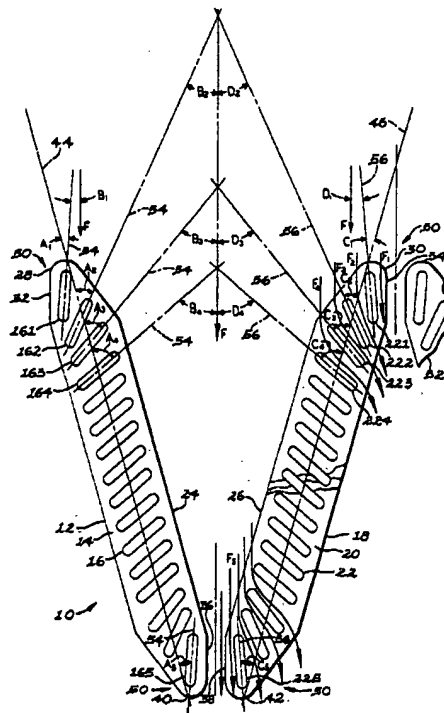


Fig 1 – Figure 1 from Anders (U.S. Patent No. 4,542,786)

[009] In regard to claims 2, 19, and 20, Anders's heat exchange fin includes rounded corner parts but he doesn't teach the dimensional value of the radius. The fin size can be different depending on the application. For example, bigger refrigerators that use bigger cooling tubes have larger fins. The size of the fin can

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be an affecting factor for the dimension of the radius on the rounded corners.

Applicant also agrees that the dimension of the radius on the rounded corners depends on the size of the heat exchange fin in the specification (0031, line 5-6).

Additionally, rounded corners will result less stress on the fin surface. Therefore, dimension of the radius on the corner will also affect the stress distribution on the fin surface. It would have been obvious to one having ordinary skill in the art at the time the invention was made to round the corners of the fin to avoid sharp edges and to be able to minimize the stress on the fin surface. Fins with rounded edges will make the installation process safer and it will help to avoid possible injuries. One of ordinary skill in the art would have arrived at these dimensions without undue experimentations.

[0010] In regard to claim 3 and 11, Anders does not explicitly teach that the inclination angle of the heat exchange fin is between approximately 50 degrees and 75 degrees or 40 degrees and 50 degrees. However, Anders teaches that the inclination angle of the heat exchange fin can be adjusted (C-5; L-40-58) in order to control airflow. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to set the angle between approximately 50 degrees and 75 degrees or 40 degrees and 50 degrees. This angle will help to adjust the amount of airflow between the fins and increase the efficiency of the system.

[0011] In regard to claim 5, referring to Fig. 2, Ho teaches an evaporator (24) installed adjacent to a wall. Anders teaches that the heat exchange fin (14') as shown in Fig. 3 is inclined toward one side relative to a vertical direction (C-5; L-

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49, 52-53). Once the Ho's heat exchange fin (42) in the evaporator (24) is replaced with the Anders's heat exchange fin (14') in order to improve the heat exchanger efficiency, than it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the bottom end of the heat exchange fin (14') is being adjacent to the wall on which the evaporator is installed.

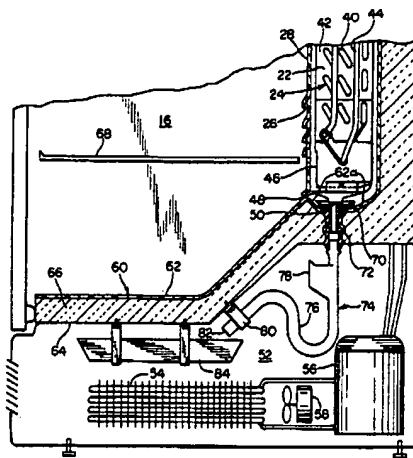


Fig. 2 – Figure 2 from Ho (U.S. Patent No. 5,499,514)

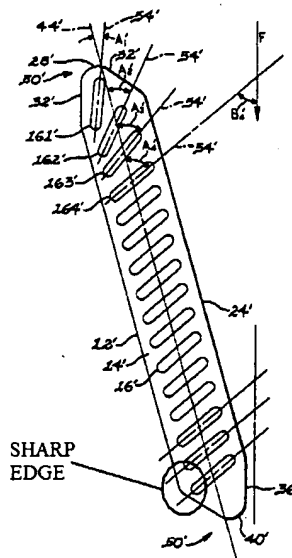


Fig. 3 – Figure 4 from Anders (U.S. Patent No. 4,542,786)

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[0012] In regard to claim 7, Anders teaches that the heat exchange fin has a substantially rectangular shape, and at least one coolant tube accommodating part is positioned on a surface of the heat exchange fin in a pair (C-2; L-26-29).

Referring to Fig. 3, one can see that the heat exchange fin (14') has a substantially rectangular shape and coolant tube (16') accommodating part is positioned on a surface of the heat exchange fin (14') in a pair.

[0013] In regard to claim 8, Ho teaches a refrigeration apparatus generating cooling air. Ho uses an evaporator (24) comprising a coolant tube (40) having at least one bending part, and at least one heat exchange fin (42) with at least one coolant tube (40) accommodating part contacting the coolant tube (C-3; L-47-51).

A defrosting unit (44) adjacent to the evaporator is used for removing frost formed on the evaporator (C-3; L-52-53). A main body including a storage compartment (14) supplied with cooling air generated by the refrigeration apparatus (C-3; L-29-30) and a door covering the opening of the storage compartment (C-3; L-14-15). Ho does not explicitly teach the details of the heat exchange fin. Anders teaches a heat exchange fin (14) being inclined by an inclination angle so that longitudinal direction of the heat exchange fin forms an acute angle relative to vertical direction (C-5; L-49-53). Opposite sides of the heat exchange fin includes rounded corner parts (C-6; L-3).

[0014] In regard to claim 10, Ho teaches a refrigeration apparatus generating cooling air. Ho uses an evaporator (24) comprising a coolant tube (40) having at least one bending part, and at least one heat exchange fin (42) with at least one coolant tube (40) accommodating part contacting the coolant tube (C-3; L-47-51).

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A defrosting unit (44) adjacent to the evaporator is used for removing frost formed on the evaporator (C-3; L-52-53). A main body including a storage compartment (14) supplied with cooling air generated by the refrigeration apparatus (C-3; L-29-30) and a door covering the opening of the storage compartment (C-3; L-14-15). Ho does not explicitly teach the details of the heat exchange fin. Anders teaches a heat exchange fin (14) being inclined by an inclination angle so that longitudinal direction of the heat exchange fin forms an acute angle relative to vertical direction (C-5; L-49-53).). Referring to Fig. 2, once the heat exchange fin (14') is installed in an evaporator and it is placed in a refrigerator, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the bottom end of the heat exchange fin is being adjacent to the wall on which the evaporator is installed.

[0015] In regard to claim 12, Anders teaches that the inclination angle of the heat exchange fin is set based on a ratio of a length of the heat exchange fin and a distance between a plurality of coolant tubes along a vertical direction (C-5; L-40-44).

[0016] In regard to claim 13, Ho teaches that the water is disposed in an evaporator accommodating part containing the evaporator (C-3; L-54-61).

[0017] In regard to claim 14, referring to Fig. 2, Anders teach the heat exchange fin has a polygonal shape.

[0018] In regard to claim 18, see claim 1.

[0019] In regard to claim 21, referring to Fig. 3, Anders's heat exchange fin includes at least one sharply-edged corner.

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[0020] Claims 4 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ho (5,499,514) and Anders (4,542,786), and further in view of Tanaka et al. (4,715,437).

[0021] In regard to claim 4, Ho and Anders teach a refrigeration apparatus comprising an evaporator, a defrosting unit, and heat exchange fin. Ho and Anders do not explicitly teach at least one protrusion from a surface of the heat exchange fin. Tanaka et al. teach that the heat exchange fin includes at least one protrusion (24) protruding orthogonally from a surface of the heat exchange fin (C-5; L-1). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have protrusion from a surface of the heat exchange fin as taught by Tanaka et al., in Ho and Anders refrigeration apparatus to make the fins stronger and stiffer. This will prevent fins from getting damaged from small impacts that might occur during installation.

[0022] In regard to claim 9, Ho teaches a refrigeration apparatus generating cooling air. Ho uses an evaporator (24) comprising a coolant tube having at least one bending part, and at least one heat exchange fin with at least one coolant tube accommodating part contacting the coolant tube (C-3; L-47-51). A defrosting unit (44) adjacent to the evaporator is used for removing frost formed on the evaporator (C-3; L-52-53). A main body including a storage compartment (14) supplied with cooling air generated by the refrigeration apparatus (C-3; L-29-30) and a door covering the opening of the storage compartment (C-3; L-14-15). Ho does not teach the details of the heat exchange fin. Anders teaches a heat exchange fin (14) being inclined by an inclination angle so that longitudinal

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direction of the heat exchange fin forms an acute angle relative to vertical direction (C-5; L-49-53). Opposite sides of the heat exchange fin includes rounded corner parts (C-6; L-3). Tanaka et al. teach that the heat exchange fin includes at least one protrusion (24) protruding orthogonally from a surface of the heat exchange fin (C-5; L-1).

[0023] Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ho (5,499,514) and Anders (4,542,786), and further in view of Jasper, II et al. (5,552,581).

[0024] In regard to claim 6, Ho and Anders teach a refrigeration apparatus comprising an evaporator, a defrosting unit, and heat exchange fin. Ho and Anders do not teach coolant tube supporters on opposite sides of the evaporator. Jasper, II et al. teach two coolant tube supporters (40, 42) on opposite sides of the evaporator supporting the coolant tube (C-2; L-32-34). It would have been obvious to one having ordinary skill in the art at the time the invention was made to use coolant tube support as taught by Jasper, II et al. in Ho and Anders refrigeration apparatus in order to support the coolant tubes of the evaporator. This will keep fins, cooling tube and evaporator sturdy and prevent them getting damaged during operation.

Allowable Subject Matter

[0025] Claims 15-17 are allowed.

[0026] Any inquiry concerning this communication or earlier communications from the examiner should be directed to Huseyin Koca whose telephone number is


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(571) 272-3048. The examiner can normally be reached on Monday - Friday
8:30AM to 6:00PM.

[0027] If attempts to reach the examiner by telephone are unsuccessful, the
examiner's supervisor, Cheryl Tyler can be reached on (571) 272-4834. The fax
phone number for the organization where this application or proceeding is
assigned is 571-273-8300.

[0028] Information regarding the status of an application may be obtained from
the Patent Application Information Retrieval (PAIR) system. Status information
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HK


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SUPERVISORY PATENT EXAMINER